CLAIM AMENDMENTS

1. (Currently Amended) A vibratory conveying apparatus adapted to vibrate and to convey material, said vibratory conveyor apparatus including:

a bed on which the material is conveyed in a direction;

a plurality of drive springs, each said drive spring having a first end, a second end and a central axis, said first end of each said drive spring being attached to said bed, each said drive spring adapted to compress and extend along a line of stroke generally parallel to said central axis of said drive spring;

a plurality of inclined stabilizers, each said stabilizer having a first end, a second end and a longitudinal axis, said first end of each said stabilizer being attached to said bed, said longitudinal axis of each said stabilizer being generally perpendicular to said central axis of a drive spring, each said stabilizer being more rigid in a direction transverse to said line of stroke than said stabilizer is rigid in the direction of said line of stroke, said stabilizers allowing movement of each said drive spring generally parallel to said central axis of said drive spring and inhibiting movement of each said drive spring generally transversely to said central axis of said drive spring;

a first pair of rotatable eccentric weights coupled to said bed, said first pair of rotatable eccentric weights including a first rotatable eccentric weight adapted to rotate about a first axis and a second rotatable eccentric weight adapted to rotate about a second axis, said first and second axes being generally parallel to one another and extending generally perpendicular to the direction the material is conveyed; and

a second pair of rotatable eccentric weights coupled to said bed, said second pair of rotatable eccentric weights including a third rotatable eccentric weight adapted to rotate about a third axis and a fourth rotatable eccentric weight adapted to rotate about a fourth axis, said third and fourth axes extending generally perpendicular to the direction the material is conveyed, said

first and second axes being spaced along the direction the material is conveyed from said third and fourth axes, said rotatable eccentric weights being fr e-wheeling with respect to one another and adapted to rotate at substantially the same operating speed with respect to one another, each said rotatable eccentric weight adapted to provide an output force generally perpendicular to its axis of rotation, said rotatable eccentric weights adapted to accumulatively synchronize with one another such that the combined resulting output force of said first pair of rotatable eccentric weights is generally parallel to said line of stroke and the combined resulting output force of said second pair of rotatable eccentric weights is generally parallel to said line of stroke;

whereby rotation of said first pair of rotatable eccentric weights and rotation of said second pair of rotatable eccentric weights, in combination with said stabilizers, accumulatively synchronize such that the output forces of said rotatable eccentric weights and their respective power outputs accumulatively add to cause said bed to vibrate along said central axes of said drive springs.

2. (Cancelled)

3. (Previously Presented) The vibratory conveying apparatus of claim 1 including a first pair of vibratory motors, said first pair of rotatable eccentric weights being respectively attached to said first pair of vibratory motors, and a second pair of vibratory motors, said second pair of eccentric weights being respectively attached to said second pair of vibratory motors.

4. (Previously Presented) The vibratory conveying apparatus of claim 3 wherein said drive springs have a natural frequency of vibration and said vibratory drive motors are adapted to rotate said eccentric weights at substantially the same operating speed, said natural frequency of said drive springs being greater than said operating speed of said vibratory motors.

5. (Original) The vibratory conveying apparatus of claim 1 wherein said first pair of rotatable eccentric weights and said second pair of rotatable eccentric weights are rotatably attached to said bed.

6. (Previously Presented) The vibratory conveying apparatus of claim 1 including a counterbalance, said second ends of said drive springs and said second ends of said stabilizers being attached to said counterbalance.

7. (Original) The vibratory conveying apparatus of claim 6 including a plurality of isolation springs attached to said counterbalance, said isolation springs adapted to support said counterbalance on a support structure.

8. (Original) The vibratory conveying apparatus of claim 6 wherein said first pair of rotatable eccentric weights and said second pair of rotatable eccentric weights are rotatably attached to said counterbalance and are thereby coupled to said bed.

9. (Original) The vibratory conveying apparatus of claim 8 including a first pair of vibratory motors attached to said counterbalance, said first pair of rotatable eccentric weights being respectively attached to said first pair of vibratory motors, and a second pair of vibratory motors attached to said counterbalance, said second pair of rotatable eccentric weights being respectively attached to said second pair of vibratory motors.

10. (Original) The vibratory conveying apparatus of claim 8 wherein said bed includes an inlet end half and an outlet end half, and a majority of said drive springs are attached to said outlet end half of said bed.

11. (Original) The vibratory conveying apparatus of claim 8 wherein said counterbalance includes a plurality of sections.

12. (Currently Amended) A vibratory conveying apparatus adapted to vibrate and to convey material, said vibratory conveying apparatus including:

a bed on which the material is conveyed in a direction;

a counterbalance;

a plurality of isolation springs attached to said counterbalance, said isolation

springs adapted to support said counterbalance;

a plurality of drive springs, each said drive spring having a first end attached to said bed, a second end attached to said counterbalance, and a central axis, each said drive spring adapted to compress and extend along a line of stroke generally parallel to said central axis of said drive spring,

a plurality of stabilizers, each said stabilizer having a first end attached to said bed, a second end attached to said counterbalance and a longitudinal axis, said longitudinal axes of said stabilizers being generally parallel to one another, each said stabilizer being more rigid in a direction transverse to said line of stroke than said stabilizer is rigid in said direction of said line of stroke, said stabilizers allowing movement of each said drive spring generally parallel to said central axis of said drive spring and inhibiting movement of each said drive spring generally transversely to said central axis of said drive spring;

a first pair of rotatable eccentric weights rotatably attached to said counterbalance, said first pair of rotatable eccentric weights including a first rotatable eccentric weight adapted to rotate about a first axis and a second rotatable eccentric weight adapted to rotate about a second axis, said first and second axes being generally parallel to one another and extending generally parallel to the direction the material is conveyed; and

a second pair of rotatable eccentric weights rotatably attached to said counterbalance, said second pair of rotatable eccentric weights including a third rotatable eccentric weight adapted to rotate about a third axis and a fourth rotatable eccentric weight adapted to rotate about a fourth axis, said third and fourth axes extending generally perpendicular to the direction the material is conveyed, said first and second axes being spaced along the direction the material is conveyed from said third and fourth axes, said rotatable eccentric weights being free-wheeling with respect to one another and adapted to rotate at substantially the same operating speed with respect to one another, each said rotatable eccentric weight adapted to

provide an output force generally perpendicular to its axis of rotation, said rotatable eccentric weights adapted to accumulatively synchronize with one another such that the combined resulting output force of said first pair of rotatable eccentric weights is generally parallel to said line of stroke and the combined resulting output force of said second pair of rotatable eccentric weights is generally parallel to said line of stroke;

whereby rotation of said first pair of rotatable weights and rotation of said second pair of rotatable weights, in combination with said stabilizers, accumulatively synchronize such that the output forces of said rotatable eccentric weights and their respective power outputs accumulatively add to cause said bed to vibrate along said central axes of said drive springs.

13. (Original) The vibratory conveying apparatus of claim 12 including a first pair of vibratory motors attached to said counterbalance, said first pair of vibratory motors respectively rotatably attaching said first pair of rotatable eccentric weights to said counterbalance, and a second pair of vibratory motors attached to said counterbalance, said second pair of vibratory motors respectively rotatably attaching said second pair of rotatable eccentric weights to said counterbalance.

14. (Cancelled)

15. (Currently Amended) A method of vibrating a conveying apparatus to convey material, said method including the steps of:

providing a bed having an inlet end and an outlet end on which material is adapted to be conveyed in a direction;

providing a plurality of drive springs, each drive spring having a first end attached to said bed and a second end attached to a support, each said drive spring adapted to compress and extend along a line of stroke;

providing a plurality of stabilizers attached to said bed, each said stabilizer being more rigid in a direction transverse to said line of stroke than said stabilizer is rigid in the

direction of said line of stroke;

providing a first vibratory motor having a first rotatable eccentric weight adapted to rotate about a first axis, a second vibratory motor having a second rotatable eccentric weight adapted to rotate about a second axis, a third vibratory motor having a third rotatable eccentric weight adapted to rotate about a third axis, and a fourth vibratory motor having a fourth eccentric weight adapted to rotate about a fourth axis, each said axis of said eccentric weights extending generally perpendicular to the direction the material is conveyed, said first and second axes being spaced from said third and fourth axes along the direction the material is conveyed, said eccentric weights being free-wheeling with respect to one another, each said vibratory motor adapted to operate at substantially the same operating speed and to provide an output force generally perpendicular to its axis of rotation, said rotatable eccentric weights adapted to accumulatively synchronize with one another without being rotationally coupled to one another such that the combined resulting output force of said first pair of rotatable eccentric weights is generally parallel to said line of stroke and the combined resulting output force of said second pair of rotatable eccentric weights is generally parallel to said line of stroke;

operating said vibratory motors to rotate said eccentric weights, such that said rotating eccentric weights accumulatively synchronize and accumulatively add their output forces and their respective power outputs and thereby vibrate said bed along said line of stroke at a vibration frequency; and

operating each said vibratory motor at substantially the same selected operating speed which approaches being equal to, or is less than, the natural frequency of said drive springs which are vibrating said bed.

16. (Original) The method of claim 15 including the step of operating said pair of vibratory motors located closest to said outlet end of said bed so as to provide a greater force output than the remainder of said pairs of vibratory motors.

17. (Previously Presented) The method of claim 15 including the step of uniformly adjusting the vibration frequency of said bed by electrically and simultaneously adjusting the rotational speed of each of said vibratory motors, while said vibratory motors continue to operate at substantially the same rotational speed with respect to one another.

18. (Previously Presented) The method of claim 15 including the step of adjusting the operating stroke and frequency of said drive springs and stabilizers by use of an electrical control connected to each said vibratory motor for simultaneously changing the rotational speed of said vibratory motors, while said vibratory motors continue to operate at substantially the same rotational speed with respect to one another.

19. (New) The method of claim 15 wherein said first and second rotatable eccentric weights are rotated in opposite directions relative to one another, and said third and fourth rotatable eccentric weights are rotated in opposite directions relative to one another.

20. (New) The vibratory conveying apparatus of claim 1 wherein said first and second rotatable eccentric weights are adapted to rotate in opposite directions relative to one another, and said third and fourth rotatable eccentric weights are adapted to rotate in opposite directions relative to one another.

21. (New) The vibratory conveying apparatus of claim 1 wherein each said drive spring is sub-resonant tuned.